WINDOWS FORMS FRAMEWORK USING C# .NET

Microsoft

.NET

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A bit of History & Background

- v1.0 released in 2002, v2.0 in 2005, now on v3.5
- A collection of technologies to:
  - Unite applications
  - Simplify development and deployment
- Three main elements:
  - Framework (CLR, FCL)
  - Products (Windows, Visual Studio, Office)
  - Services (WindowsForms, ADO.NET, ASP.NET)
.NET Architecture Overview

.NET Framework

- C#
- VB.NET
- C++
- Other

Common Language Specification

Framework Class Library
- ASP.NET
  - Web Services
  - Web Forms
  - ASP.NET Application Services
- Windows Forms
  - Controls
  - Drawing
  - Windows Application Services
  - Threading
  - IO
  - Diagnostics
  - Etc.

Common Language Runtime
- Memory Management
- Common Type System
- Lifecycle Monitoring

Operating System
Introduction

What is it?
- A GUI API included as a part of Microsoft’s .NET framework
- Provides access to Microsoft windows interface elements
- Used for creating event-driven applications

Why?
- An entrenched application in wide use with a substantial development community
- Provides a graphical canvas for understanding how OO development works
The main services aka modules!

- **Standard GUI components**
  - System.Windows.Forms

- **Supportive components and services**
  - System.Drawing
  - System.EventHandler

- **Other Application services like ADO.NET**
  - System.Data.SqlClient
  - System.Data
High Level Design

**FORM CLASSES**
Collection of classes for creating Windows – based applications

**SQL CLASSES**
Collection of classes used to access SQL Server Databases

**EVENT HANDLERS**
Delegate that provide directions as to how specific events will be handled
Class Diagram
System.Windows.Forms

Form
- WindowState
- Close()

Textbox
- MaxLength
- AppendText()

Button
- ClickMode
- OnKeyUp()

Point

Size

Control
- Name
- OnClick()
System.EventHandler

- Delegate: The basis for events
- Similar to function pointers in C/C++
- Allows programmer to encapsulate a reference to a method inside a delegate object
- Another way to achieve “Polymorphism”
Sequence Diagram
EventHandler

- Application
  - Form
    - Control
      - Drawing
        - System.EventHandler
          - new property values
          - generate_event()
          - execute_eventHandler()
            - return_control()
Demo Application

- Desktop Database for Dr. Anderson to manage the grades of the students in the OOAD class
  - Demonstrates the use of Windows Forms and Controls
  - Utilizes event handlers to trigger actions based on control events
  - Interacts with database to store and import data
OO Concepts & Principles

- Polymorphism
  - Inheritance hierarchy
- Code to an interface
  - OnClick
- DRY
  - Delegation
- SRP
  - TextBox vs. TextBlock
- OCP
  - New service eg. Pie Menus
- LSP
  - EventHandlers
Conclusion / Evaluation

• Advantages
  ◦ Comprehensive form creation application
  ◦ Easy to learn and use with IDE
  ◦ Linkages to a broad framework provides robust tools and features

• Disadvantages
  ◦ Proprietary nature hinders portability. Applications not Mac or Linux compatible.
  ◦ MS resources increasingly more focused on web
  ◦ Framework imposes constraints on the application that might not be encountered in a more open and sparser architecture
Questions??